



Republic of South Africa

EDICT OF GOVERNMENT

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SANS 6051 (2007) (English): Water - Oil and grease content



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ISBN 978-0-626-19714-8

SANS 6051:2007

Edition 2

SOUTH AFRICAN NATIONAL STANDARD

Water — Oil and grease content

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standards
SouthAfrica
(a division of SABS)

SANS 6051:2007

Edition 2

Table of changes

Change No.	Date	Scope

Foreword

This South African standard was approved by National Committee StanSA SC 5140.19A, *Water – Water sampling and analysis*, in accordance with procedures of Standards South Africa, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in May 2007. This document supersedes SABS SM 1051:1981 (first edition).

Water — Oil and grease content

1 Scope

This standard specifies a method for the determination of the oil and grease content of water and wastewater.

NOTE For low levels of oil and grease (<10 mg/L) it is recommended that a partition-infrared method be used.

2 Normative reference

The following referenced document is indispensable for the application of this document. All normative documents are subject to revision and, since any reference to a normative document is deemed to be a reference to the latest edition of that document, parties to agreements based on this document are encouraged to take steps to ensure the use of the most recent edition of the normative document indicated below. Information on currently valid national and international standards can be obtained from Standards South Africa.

SANS 3696/ISO 3696, *Water for analytical laboratory use – Specification and test methods*.

3 Principle

The organic solvent, petroleum ether, dissolves all oil and grease present in a water sample. The organic extraction part is separated off, evaporated and the total oil and grease content is determined gravimetrically.

4 Reagents

4.1 General

Unless otherwise specified, only use water that complies with the requirements for grade 3 water as given in SANS 3696, and reagents of analytical reagent grade.

4.2 Petroleum ether

Use petroleum ether that has a boiling range of 35 °C to 60 °C. Distil at least twice in an all-glass apparatus, discarding the last 10 % remaining in the flask after each distillation.

4.3 Sulfuric acid

Dilute 1:1 solution.

5 Apparatus

5.1 Separating funnel, of capacity approximately 2 L and with a no-lubrication stopcock or with all greasy lubricants removed from the ground glass surfaces.

5.2 Filter, Whatman 40 or a water separator filter paper, for example, 1 PS Phase separator.

5.3 Distilling flask.

5.4 Waterbath.

5.5 Dessicator.

5.6 Rotavaporator, 70 °C.

6 Sample collection, preservation and storage

6.1 Collect a representative sample of at least 1 L in a wide-mouthed glass-stoppered bottle that has been previously washed with soap, rinsed with water and finally rinsed with solvent petroleum ether and air-dried.

NOTE The bottle should not be overfilled as a loss of floating oil might then occur on stoppering.

6.2 The sample shall not be subdivided in the laboratory but used in total.

6.3 If analysis is to be delayed for more than 2 h, preserve the sample with 5 mL 1:1 sulfuric acid per litre of sample and refrigerate to inhibit bacterial action.

7 Procedure

7.1 When a sample is brought into the laboratory, mark the sample level on the bottle for later determination of sample volume (see 7.9).

7.2 After agitation of the sample of known volume of not less than 1 L, to ensure homogeneity, transfer the entire sample to the separating funnel, and acidify with 5 mL of the sulfuric acid per litre unless already acidified for storage (see 6.3).

7.3 Rinse the sample bottle carefully with 15 mL of the petroleum ether and add the petroleum ether washings to the separating funnel. Add an additional 25 mL of the petroleum ether to the separating funnel, and shake it vigorously for 2 min.

7.4 Allow the petroleum ether layer to separate, withdraw the aqueous portion of the sample into a clean dry container and transfer the petroleum ether layer into a clean, weighed distilling flask.

7.5 If a clear petroleum ether layer cannot be obtained, filter the petroleum ether layer into the weighed distilling flask through a funnel containing a petroleum ether-moistened filter paper. Use as small a funnel as possible and filter as is practicable.

Wash down the funnel and filter paper twice with 5 mL increments of fresh petroleum ether.

7.6 Return the aqueous fraction to the separating funnel, rinsing the container with 15 mL of the petroleum ether. Add the petroleum ether washings and an additional 25 mL of the petroleum ether to the separating funnel, and agitate for another 2 min.

Allow the petroleum ether layer to separate, and discard the aqueous layer. Add the petroleum ether extract to the weighed distilling flask, and rinse the separating funnel with 20 mL of the petroleum ether into the weighed distilling flask.

Record the total volume of the petroleum ether that has been used.

7.7 Distil off all but approximately 10 mL of the petroleum ether extract, keeping the source of heat at about 70 °C with the rotavaporator. Then disconnect the condenser, and boil off the remaining petroleum ether at the same temperature. Dry the flask on a water bath. Cool in a desiccator and record the mass of the residue until constant weight.

7.8 Subject an aliquot of the petroleum ether, of accurately known volume of not less than 100 mL, to the same evaporation procedure (see 7.7) as that applied to the petroleum ether extract.

Record the mass of the residue until constant weight.

7.9 To determine the initial sample volume, fill a sample bottle to mark (see 7.1) with water. Pour the water into a 1 L graduated measuring cylinder and record the volume in millilitres.

8 Calculation

8.1 Calculate the mass of the residue R , in milligrams, from the solvent used in the petroleum ether extract, as follows:

$$R = \frac{m_1 - V_2}{V_1}$$

where

m_1 is the mass of residue on evaporation of the petroleum ether aliquot (see 7.8), in milligrams;

V_2 is the volume of the petroleum ether used in the petroleum ether extract (see 7.6), in millilitres;

V_1 is the volume of the petroleum ether aliquot, in millilitres.

8.2 Calculate the oil and grease content G of the sample, in milligrams per litre, as follows:

$$G = \frac{(m_2 - R) \times 1000}{V_3}$$

where

m_2 is the mass of residue on evaporation of the petroleum ether extract (see 7.7), in milligrams;

R is the mass of residue from the solvent used (see 8.1), in milligrams;

V_3 is the volume of test sample, in millilitres.